Issues and Challenges in Management related to Information Technology

Vandana[1], Bornali Purkayastha[2]and Anil Kumar[3]

[1] Dept. of Computer Science & Engineering Amity School of Engineering and Technology, Amity University, Rajasthan, Jaipur, India
[2]Dept. of Applied Physics, Amity School of Applied Sciences, Amity University, Jaipur, Rajasthan, India
[3]Dept. of Software Engineering, Faculty of Engineering and Technology, Wachemo University, Hossana, Ethiopia

Abstract: There are many IT issues and challenges in management including Cloud Computing, Virtualization, Emerging Technology, Big Data Analytics, BYOD (Bring Your Own Devices) and BYOA (Bring Your Own Applications), Shadow IT, Boomers (a transient worker) , Interoperability, User Systems, Energy Efficiency, Creating Value, Social Networks and so on. In this paper, we highlight three challenges: Cloud Computing, Virtualization and Social Networks. Over the last few years Cloud Computing, Virtualization and Social Networks have become modern trends in the information technology space that increase the accessibility and flexibility for the users around the globe. Cloud Computing offers faster innovation, flexible resources and economies of scale, whereas Virtualization deals with better control on IT resources like applications, wide area networks, local area networks, servers, desktops, storage and appliances like firewalls and application delivery controllers. Social Network defines an online service platform where users are able to build relationships with each other by message, posting information, images etc. Despite the success of cloud computing, virtualization and social networks face tremendous challenges such as downtime, vulnerability to attack and limited control in cloud computing, backup and resource distribution in virtualization, security and privacy threats in social networks that are preventing management of organizations from accepting these techniques. This paper gives an overview of these technologies and identifies the different technical challenges and proposes suitable directions to resolve them. In addition, we separately focus on features, types, and myriad benefits of these technologies and discuss solutions that can protect users from these issues. We then present findings, future direction and discuss some techniques to overcome these challenges.

Keywords: Management, Technical challenges, Cloud computing, Virtualization

1. INTRODUCTION

The advancements of information technology, powerful data analysis software, availability of large numbers of digital data sources have together helped business managers to generate and work with large data sets. Many organizations are working with these techniques because of its convenient feature, on demand output, flexibility, scalability, reliability, elastically, broad network access, increased speed, rapid service and minimal management effort. These techniques are considered advanced and gaining popularity because they offer many benefits to organizations such as cloud computing technology, increase the scalability of business organization and make easier employee collaboration. Organizations can save ample amounts of money with these resources and avoid spending money by creating large structures to manage software and hardware.

On the other side virtualization technology offers a highly specialized and customized environment that refers to the ability to run multiple operating systems simultaneously on a single physical machine called a virtual machine. Virtualization is closely linked with cloud computing and these computing technologies are associated with it, including storage, server, operating system, network and application. It provides several benefits like flexibility, scalability, cost savings, and reduced organizations space and power requirements [1]. Other technology Social Networks are online mediums to make connections with family, customers, clients and friends [2]. There are many websites providing social relationships like LinkedIn, Twitter, YouTube and Facebook. Organizations are taking benefits from these websites to connect them with their suppliers and customers through a single online platform. There are various technical issues for adopting these technologies such as cloud computing that raises many IT challenges such as data accessibility by third party providers, cyberattacks, insider threats, lack of standardization and government intrusion. Other is virtualization its challenges includes VM sprawl, continuity, performance monitoring, security, unleashed virtual machines, backward compatibility, Licensing restriction [3] and Social networks include various challenges such as hard

time scaling, workplace loops (the term refers to an employee's low performance and productivity at workplace), privacy concern, unwanted activity, difficult monetizing [4]. By adopting some effective approaches, these challenges can be overcome, such as hosting training seminars, being proactive for loss prevention, using data mitigation tools for safe data, making potential policy for data recovery, establishing a strong and secure environment for data sharing, determining trustworthy vendors, reducing cost, improving data security and so on. This paper is categorized into following sections including definition, benefits, architecture of different techniques & their issues and challenges. Then, we focused on possible ways to overcome them. Finally, we conclude research findings and describe future direction.

2. CLOUD COMPUTING

Cloud is the metaphor for the web world and cloud computing is a method for processing, storing and managing data via the internet without any physical network or computer. It provides various computing services like analytics, software, database, servers, networking, storage and many more over the web. Managements are running all kinds of apps in the cloud like accounting, CRM (customer relationship management), HR, ERP and much more [5]. Largest organizations moved their applications i.e. Salesforce.com, Microsoft Azure, Google Drive, iCloud, OneDrive, Office365, Dropbox. OpenStack, Google Compute Engine etc. on cloud [6].

A.   Features of Cloud Computing

Cloud has numerous features that increase the performance of services provided by cloud computing. With the advancement of this technology organizational management decide to move their business on cloud to avail future benefits. Here mentioned following features:

- *Rapid expansion*: Cloud computing is spreading rapidly even faster than expected due to its services and resources. The world was not aware a decade ago about cloud computing but today in the IT field this technology is considered as a new solution [7].

- *Resource pooling*: Using a multi-tenant model the provider's computing resources include storage, memory, processing and network are pooled to serve multiple consumers with different virtual and physical resources according to consumers demand they are dynamically assigned and reassigned.

- *Broad network access*: With wide range users can access information from anywhere from any device such as tablets, PCs, Macs and smart-phones with broad network access which refers to resources hosted in a private cloud network that are available for access [8].

- *On-demand self-service*: Amazon Web Services Elastic Cloud Computing is the best example of On-demand self-service which means without requiring human interaction with each service provider consumer can use cloud resources automatically, as needed.

- *Measured Service*: For various reasons, including effective use of resources, billing or overall predictive planning this service is used where the cloud provider monitors or measures the provision of services.

B.   Types of Cloud Computing

Before uploading an application one has to choose the cloud type that is best suited according to the individual's requirement. Listed below are types of cloud which provided different services, flexibility and performance [9]. Therefore, classification of cloud type is shown in Table 1.

- *Public cloud*: This cloud is operated and owned by a third party, which delivers computing resources. Google Drive is an example of a public cloud. With this service all resources are managed by cloud providers. These services are accessible by user's account using a web browser.

- *Private cloud*: Private means which is operated by single management or business. Its services can be accessed by individuals and located physically on organizations data centers. Infrastructure and its services maintained by service providers on a private network.

- *Hybrid cloud*: Combination of public and private cloud is hybrid, it allows to share data and application between them [10]. It gives better flexibility to organizations by moving data and application between private and public clouds. Hybrid cloud helps to optimize existing security, compliance and infrastructure.

- *Dedicated server*: This server is best for Security, business-critical operations,sensitive, plus demanding performance and compliance requirements. It is useful for predictable workloads that require enhanced control and security.

- *Community cloud*: It is a cloud service model that shares cloud computing solutions to different organizations that are related to the same community. By the third party or organizations, it may be managed and may exist on premise or off premise.

C.   Types of Cloud Computing Services

Cloud computing services are categorized into various segments and these segments deliver IT services to their customers. These segments are cloud computing stack because they are placed one on top of another, but they are different from each other in order to achieve different business goals [11]. Three main cloud service models will be shown in Fig. 1.
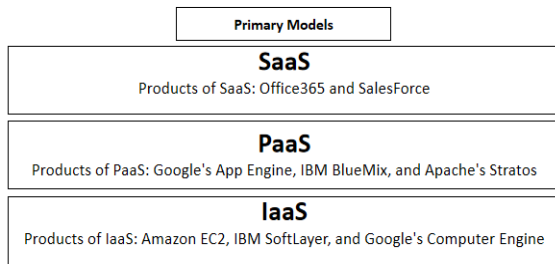
Primary Models
SaaS   Products of SaaS: Office365 and SalesForce
PaaS   Products of PaaS: Google's App Engine, IBM BlueMix, and Apache's Stratos
IaaS   Products of IaaS: Amazon EC2, IBM SoftLayer, and Google's Computer Engine

Figure 1.   Primary cloud computing service models with their products.

TABLE I.   CLASSIFICATION OF CLOUD TYPE WITH SUITABLE FEATURES

	Public Cloud	**Private Cloud**	**Dedicated Servers**	**Hybrid Cloud**
Description	Multiple-occupant environment with pay-as-you-grow scalability	It includes the scalability and enhanced security and control single-occupant environment	For future workloads that require enhanced control and security	Public cloud connect to private cloud or dedicated servers in own data center
Physical Hardware	Shared	Dedicated	Dedicated	Shared + Dedicated
Best for	Public-facing operations, non-sensitive and unpredictable traffic	Business-critical operations, sensitive	Security, business-critical operations,sensitive, plus demanding performance and compliance requirements	Join dedicated, public and private servers for the best each
Scalable	√	√	×	√
Utility Billing, Low Cost	√	×	×	√
Flexible	√	×	×	√
Customizable	×	√	√	√
High Performance	×	√	√	√
Enhanced Control and Security	×	√	√	√
Predictable Cost	×	√	√	√

a. Private cloud is not flexible because of increased automation and user self-service.

- *Iaas (Infrastructure as a service)*: With Iaas, people can rent IT infrastructure including servers and VM (virtual machine), operating system, networks and storage from cloud providers on a pay-as-go basis.

- *Paas (Platform as a service)*: It describes supply an on-demand environment for- testing, delivering, developing and managing software applications.

- *Serverless computing*: It focuses on building app functionality without managing the infrastructure and servers. It is highly scalable, and event driven when specific functions occur.

- *Saas (Software as a service)*: It is a method for delivering software services over the internet on subscription and on demand basis. With Saas users can connect to the application over the internet with browser on their PC, Phone and Tablet.

- *Xaas (Anything as a service)*: In the service segments, cloud computing has seen tremendous evolution. Talking about XaaS . This cloud computing model somewhat ironic term that provide a infrastructure and a program as a service. This includes all the services over the web or similar networks through cloud that customers can order.

D.   Issues and challenges of cloud computing

Cloud computing challenges are numerous including vendor lock-in, security, energy management, lack of resources/expertise, managing cloud integration, multi-cloud environments, vendor lock-in, security, energy management, lack of resources/expertise, managing cloud spending, change management, governance, compliance, migration, standardized service level agreements (SLA's) lack, immature technology, workload management, risk management, performance management and quality of service issue. According to RightScale Survey, the top eight challenges of cloud computing have shown in Fig. 2. Above mentioned all challenges of cloud computing including RightScale Survey and others will now be explained in detail.

- *Security*: Keeping data safe and secure is the foremost responsibility for organization management. For security of cloud cybersecurity experts and other staff are always concerned [13]. They are always scared about data loss, breach of confidentiality and data privacy. Cloud cost and security is the largest challenge for cloud users. It is a serious issue for management also because these days data stored in distributed locations within the country or across countries causes a major risk of confidentiality privacy breach.

- *Managing cloud spending*: Organizations are wasting about 30% of the money they spend on the cloud. Companies make lots of mistakes that help to drive up their costs. This issue occurs because sometimes they use cloud instances for a short period of time and forget to turn it back off. These mistakes increase the cost that affects the financial condition of organizations.

- *Lack of resources/expertise*: Lack of resources and expertise are also one of the biggest challenges of cloud computing for organizations. For maintaining the functionality of cloud, good

resources and certified cloud computing staff are required which are not that much easier tasks. This challenge is hampering cloud computing technology because it is difficult to find IT workers with cloud computing skills.

- *Governance*: Governance is also one of the greatest challenges in cloud computing. Deploying new computing resources and speed can become a potential downfall in cloud computing. Organizations not properly focused on "Shadow IT" are used by their employees, and in this case, governance becomes specifically challenging in multi-cloud and hybrid cloud environments.

- *Compliance*: For many enterprise IT teams, general data protection regulations have returned compliance to the forefront. Difficult compliance makes industry work complicated. It improves legal and statutory obligation on various companies.

- *Multi-cloud environments*: Organization Management is not using only one cloud. According to findings 81% businesses are pursuing multi-cloud strategy, 51% using hybrid cloud strategy which includes public and private clouds integrated together [12]. Multi-cloud challenges add complexity for IT teams. Even on average, organizations are using 4.8 different private and public clouds.

- *Performance management*: Measuring delivery services level are critical issues for organizations to detect whether service providers agreed at service level as stipulated in the SLA. Hence, this issue majorly affects the service provider as well as organizations.

- *Integration*: Integration is the biggest challenge for cloud computing because of this many organizations with hybrid environments not able to work together with their public cloud and on-premise tools and application. In the report 30% of respondents complain that connecting legacy systems with cloud apps is a big barrier for adoption.

- *Vendor lock-in*: Microsoft Azure, IBM Cloud, Amazon Web Services these few vendors dominate the public cloud market and this raises the specter of vendor lock-in. According to a survey more than 80% surveyed expressed concern about the problem. IaaS providers increasing dominance of hyper-scale generates enormous challenges and opportunities for end users.

- *Migration*: It is a fairly straightforward process to launch a new application in the cloud. Moving an existing application to a cloud environment is quite difficult. According to the survey, cloud project migration is more complicated than expected. Migrating applications to cloud raises various issues including slow data migration, trouble getting migration tools to work properly, time-consuming, trouble-shooting, difficulty configuring security and downtime during migration.

- *Immature technology*: Number of services of cloud computing are on the cutting edge of technologies like augmented reality, artificial intelligence, machine learning, advanced big data analytics and virtual reality. In terms of performance, reliability and usability services don't always live up to enterprise expectation and it is the potential downside to access to exciting and new technology [14]. Immature and low performing technology is also a big challenge of cloud computing.

- *Change and energy management*: Expenses of powering and cooling accounts are half percentage of the total expenditure for operational record centers. It has been found that data centers are consuming high amounts of energy. The consistent use of computing application contents increases day by day which requires large servers and fast disk for data management and processing of that data which requires to get the solution for lower energy consumption of record centers. On the other hand, change management is also a bigger issue for cloud computing. Implementation of cloud computing has changed the way organizations are adopting their daily activities. Change in the management process is therefore a serious issue of cloud computing.

- *Workload and risk management*: The issue of workload management faced by service providers because they are required to spread the services between their different customers to fulfill demands of their valuable customers [15]. This issue decreases the resources and increases energy consumption. Another serious issue is risk management because the successful implementation of cloud computing depends on mitigation, reduction and proper management of risk included with cloud computing [16].

- *SLA's (Standardized service level agreements) lack and quality of service*: In cloud computing market there are different types of SLA's because of the cloud computing resources of different definitions which described often through various non-standardized resources such as outbound bandwidth, inbound bandwidth, CPU cores, execution time and processor type. It is difficult to have standardized SLA for service providers. For service providers and users there is a need to standardized SLA to ensure delivery of agreed infrastructure and services that will guide their business relationship. Hence, this issue affects service providers and cloud computing technology [17]. On the other way Qos (Quality

of service) is another issue of management because organizations are doubtful about the ability of service providers because they are moving their valuable applications to the cloud and concerned about commitment of high quality service provided by the service providers.

E. How to address Issues and challenges of Cloud Computing

Cloud computing is a fairly new paradigm for computing services and it has introduced a number of benefits but it faces a variety of challenges that impact the infrastructure and services development of cloud. Organizations are impressed with cloud computing's obvious benefits but they are also overwhelmed by its wide range of challenges. For future success of the cloud computing industry, service providers and customers are concerned to address issues and challenges of cloud computing. However, some common steps highlighted here to overcome challenges of cloud computing:

- *Security establishment*: In the cloud-sharing market companies are subject to particular privacy laws and data security. In cloud infrastructure(e.g. applications, operating systems and firmware), the Cloud Service Provider (CSP) needs to apply security patches and some useful techniques such as Sender Policy Framework (SPF) to authenticate, classify, filter and verify
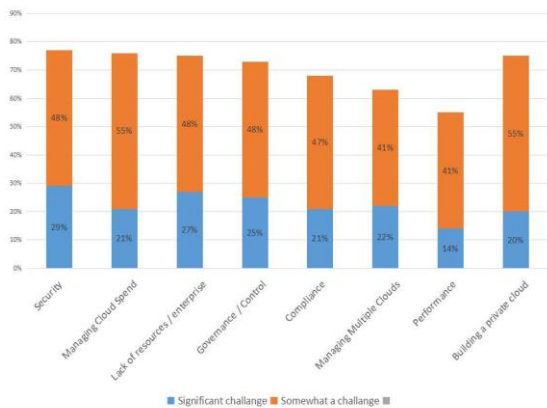

Figure 2. Major issues and challenges of cloud computing.

spam data. For data loss prevention encrypt data with homomorphic encryption and proxy re-encryption scheme and be proactive and ready for content recovery [18].

- *Avoiding lock-in*: To switch on another cloud provider some vendors try to lock-in consumers by not permitting them. Extreme penalties and sneaky contract terms is the most common form of what is doing this. For switching on service providers, data migration tools are necessary to ensure that individual's data is secure and safe [19].

- *Changing perceptions*: Staff learning curve is the most overlooked challenge of cloud computing. Establishing new terms of authorization means

shifting applications on the cloud to access internal information. Department communication with one another also affects the cloud. By hosting virtual learning environments, web-based training, digital collaborations and computer-based training seminars organization leaders may approach to overcome this challenge. Also, for implementing cloud services open door policy should be applicable for the first few months.

- *Shifting systems*: To provide the same services computers have to efficiently link with an outside system in the cloud. Rather than having everything on one hard drive, it makes it rely on each other. Moving all functionality at once to the cloud is not advisable because of the above reason. To address this issue find the balance between necessary programs currently running from an external source, and prefer keep off the cloud.

- *Choose right infrastructure*: Success of cloud depends on the right cloud that suits organizations needs including choosing the correct cloud model, cloud type and understanding current workload levels [20]. Choosing the best model: IaaS, PaaS, Saas of cloud and right type: Public, Private and Hybrid can overcome issues of cloud infrastructure.

3. VIRTUALIZATION

Creation of a virtual version of a device and resources such as an operating system, disk storage or server called virtualization where virtualization divides those physical resources into one or more executable environments. Application, devices and people are real logical resources but they may communicate with virtual resources. Virtualization is associated with many computational technologies that cover these issues including virtualization of disk storage, servers, operating system, networks and application virtualization [21]. This technology seems more attractive because of cost savings and additional capabilities but these benefits increase security risk.

A. Types of Virtualization

Virtualization represents a wide category of technology and tools that provides many benefits to an organization. It is the process or concept of departing the logical from the physical. It refers to a class of technology in-spite of one specific technology. This technology helps to create different virtual machines (VM) and share resources between them [22]. Broader classification of VM will be shown in Fig. 3. Virtualization technologies are effective for all whether on the small scale like phones or large scale like servers and data centers. In this technology there is one piece of software that permits the physical servers to have multiple attributes of virtual machines and it is called as Hypervisor (e.g. Xen, KVM (Kernel-based Virtual Machine), VMware, etc.) [23]. Hypervisor is also called as VMM (virtual machine monitors). Type of virtualization technology explained below:

- *Data virtualization*: Data virtualization technology abstracts data in which source of individual aspects of data whether fields, database, etc. are exist on a common data access layer and the end user is invisible to the data source. This technology allows individual methodology for access of data regardless of where and how data is stored. It reduces the risk of data corruption and increases cost saving.

- *Network virtualization*: Network virtualization eliminates the network device from services that are delivered over the network. This can be done by using hardware and software both together in single administrative pairing. This pair allows separation of networks into virtual networks, named VLANs. Virtual network has three basic components such as Network hardware (including virtual switches, NIC (network interface cards) and VLANs), network storage devices and network media (including Ethernet or fiber Channel). It provides security, flexibility and high availability for organizations [24].

- *Mobile virtualization*: It is embedded software technology for mobile devices.The hardware, applications and data in mobile virtualization technology are isolated through the use of a hypervisor. This isolation allows the mobile device to run a reliable way to consume less memory and power. This functionality is incorporated across multiple mobile devices, tablet and laptop platforms including Linux 2.6x, Windows CE 5.0 and 6.0 and Symbian. The Android operating system is a good example of mobile virtualization technology to produce smartphones without a separate base-band processor.

- *Memory virtualization*: In modern computing memory virtualization is an important aspect, whether related to a clustered environment and individual computing device. It includes usable memory by using disk space, sharing physical memory or sharing memory between clustered devices in a hypervisor environment [25]. Microsoft Windows virtual memory features are most familiar in memory virtualization applications.

- *Storage virtualization*: Storage virtualization creates logical abstractions of storage systems for physical systems. For managing a diverse storage system it simplifies storage administration and reduces cost. It provides additional features to hardware and software and enables better functionality to increase speed and reliability. By sharing resources and increasing speed and security to data functions, it gives flexibility to administrators.

- *Grid computing*: It is another way to separate and abstract multiple servers and computers from the application or services that they are providing. Grid computing requires more coordination to provide more capability. It is the process to create a common goal with collection of computer resources from multiple locations that are working together [26]. It is sometimes called super virtual computers.

- *Desktop/Application virtualization*: From one computer device to other computer device or smart display system, it has capability to display a graphical desktop. One famous example of desktop virtualization is remote desktop. From the physical device It separate the desktop and application. Remote desktop mainly used for high latency environments, remote support [27]. It also allows the functionality of MS windows on portable devices which is non windows like phones and tablets. It has many benefits and applications except only remote desktop functionality.

- *Server virtualization*: Server virtualization divides the resources of one computer or server among guest OS that are virtual. This type of software is called a hypervisor. Hypervisor has capability to run on multiple virtualized systems. Server virtualization includes various benefits like optimization of resources, cost savings, best performance and flexibility.

- *Full virtualization*: On the physical hardware, any software capable of execution can be run in the Virtual Machine (VM) for this type of environment. Simultaneously, users can run multiple different guest OS [28]. In a number of situations, full virtualization is particularly helpful. It offers the best security and isolation for VMs.

- *Partial virtualization*: When some or many applications can run but the entire OS cannot run in the VM that is called partial virtualization. Execution of partial virtualization is easier than full virtualization because each VM consists of a separate address space. This virtualization was
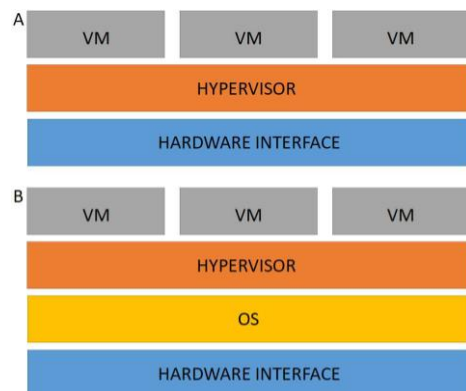

Figure 3.   (a) software virtual machines; (b) hardware virtual machines.

used in the time sharing system and first-generation.

- *Para virtualization*: For the virtual machines, para virtualization doesn't need to simulate the hardware because it works differently from the full virtualization. On a host (physical server), the hypervisor is installed and a guest operating system is installed into the environment. To communicate with the host in this virtualization, guest source code will be modified with sensitive Information.

B. *Issues and Challenges of Virtualization*

- *Licensing compliance*: Virtualization can raise compliance issues by using existing licensed software in a virtual environment, if multiple virtual machines are created then the organization is licensed to use the software on. More importantly, it affects the growth of the virtual environment and compliance and servers are not maintained properly in an effective manner according to everyone's needs.

- *Capacity management*: One of the most typical tasks to making capacity management in a virtual environment. By using virtual machines companies can consolidate work pressure but in this case on a single physical machine, applications need different operating systems. As a result, organizations lead to face capacity management issues.

- *Performance issues*: Increasing value of virtualized environment needs safe balancing act : extreme capacity in a given VM converted to useless IT expenditure. Although, not sufficient capacity raises poor user experience and maintaining the performance of high application is the major issue in virtualization.

- *VM sprawl*: VM sprawl is another major issue for virtualization. Increasing the number of virtual machines can lead to more VMs than are necessary for the organization to function. VM sprawl reduce the functionality of VMs and exacerbate resource distribution problems by diverting resources to VMs that are not being used. It seems harmless but it is quite harmful for organizations.

- *Backup*: In virtualization no real storage device exists like a hard drive on which system and data can be backed up, to access backups at every time is difficult because of frequent software updates. Tracking and accessibility of backups is quite typical without any actual storage device. Backup issues also impact the performance of virtual machines.

- *Resource distribution*: Partition systems of virtualization can result in some that purpose actually good and others that don't seem to have access to sufficient resources to meet their requirement. In the transition to virtualization, resource distribution challenges mainly occur early. Moving resources from one place to another is difficult for providers.

- *Backward compatibility*: Backward compatibility is quite a difficult and time-consuming issue in virtualization. Many organizations use legacy systems which can raise problems with newer virtualized programs and software. Vendors are facing these difficulties while using legacy systems with new virtualization software.

- *Network and Storage bottlenecks*: Storage and network bottleneck related to high percentage of performance issues that are detected in virtualized environments. These issues impact on VM performance and it also targets technical devices which are associated with virtual environments. Performance issues of VM are related to storage array and host.

- *Security*: Security can be compromised of virtual systems when users don't use the best method to keep secure downloads, passwords and other activity. For virtualization or other information technology challenges security can be a problem for all. Every organization needs a secure virtual system so that they can be concerned about security challenges of virtualization.

C. *How to address Issues and Challenges of Virtualization*

- *Manage complexity*: Management of virtualization components such as VMs, VM monitors and hypervisors are one of the most typical tasks for organizations. To overcome this administrator must set up multiple management tools which can effectively manage virtualized data center resources and environments.

- *Increase storage requirements*: In virtualization environments, tens to hundreds of GB size OS files are converted to VMDK files, and stored in shared file servers that affect the capacity of storage environments. As a result, using some powerful device burden on storage infrastructure can easily reduce storage costs in a virtualized environment.

- *Utilize unused features of virtualization*: Server virtualization provides useful capabilities including switching virtual software, virtual LAN support, VM migration which may not be utilized properly with existing infrastructure. By sharing information between the system can overcome the issue of unused features of virtualization.

- *Application awareness*: During VM migration lack of application awareness which is vital for maintaining state for uninterrupted application availability. For maintaining awareness of critical applications such as resource usage, state and performance setup systems which can help to

ensure that applications are maintained during VM migration.

- *Arrange Resources*: On one physical server running a number of virtual machines can increase utilization or burden of hardware resources. So by using an efficient system, burden and cost can reduce and increase VM density on servers. This approach provides significant complete enhancements in a virtual environment.

4. SOCIAL NETWORKS

Social networks means integrating different people on one common online platform. With the help of social networking websites information like texts messages, photos, videos can be shared between family and friends . It allows users to create their profile and connect with each other on the same medium. Most common social sites and mobile applications available these days such as whatsapp, myspace, hike, facebook, twitter, linkedin, instagram [29]. While using social networks users think that their conversation is private and safe but it is not actually true because it has become platforms for cyber criminals who can exploit personal and sensitive information through hacking. Number of uses of most popular social networking sites daily uses figure will be shown in Fig. 4. Although it has various benefits and challenges and how to overcome those challenges all study will be discussed below.

A. Benefits of Social Networks

Everybody is dependent these days on social networks to communicate with each other. Social sites are one of the
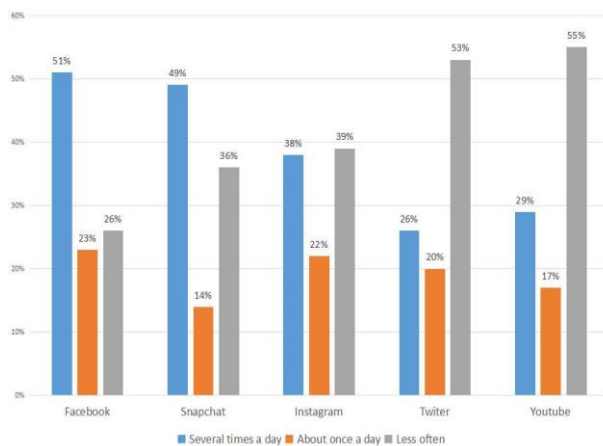

Figure 4.   Daily uses percentage of popular social sites

easiest way of connecting people across the world and it is unavoidable for today's young generation. It has become common practice for organizations also. Social networks have numerous benefits that will be discussed now.

- Increased exposure: By effective content strategy and creating valuable content one can boost social network exposure. Digital marketing is one of the most popular method for publishing useful

content on online platform which can be viewed by users and interacted with social media community easily [30].

- *Developed loyal fans*: Social networking creates virtual relationships with users and organizations where they can like, comment and share their thoughts easily. Today's generation has shifted their great interest on many things including online shopping, searching information about services and products and so on. By providing these useful features they are making strong relationships with customers.

- *Improved search rankings*: To get useful information by clicking on the link from social sites increase search rankings of websites. Traditional methods to get information from television, e-mail, phone and print media prove to be more costly as compared to social sites and not that much effective also.

- *Reduced marketing expenses*: Advertising and promotion of any new products and services are pretty easy on social sites. Organizations or individuals can upload their data and details on sites and share with different people can reduce marketing expenses and save cost.

- *Improved sales*: Online publicity of products and services can improve sales of the organizations and it also facilitates them to get all information from one medium. By digital campaigns technology giants can get better revenue also.

- *Grown business partnerships*:Virtual relationships on social sites between companies and customers are the most powerful way to grow business partnerships effectively. Organizations or companies can endorse their products and services information across the globe and provide rapid facility easily with social networking websites [31].

B. Issues and Challenges of Social Networks

- *Public Bashing*: Users of social networking sites unaware of the privacy risk when they share personal or sensitive data with others [32]. When a number of users connect with each other on one network then it raises an issue of security. SNS (social networking sites) has a broad range of negative impacts for the public and these issues affect individual or company reputations [33].

- *Misuse of free contests*: Intensive use of social sites increasing number of contests sharing their secrets with no reward. Participants design their ideas and upload on social sites but social networking winner generator tools knowingly choose superior ideas from a number of contestants and it doesn't compensate others [34]. This approach creates issues of misuse free contests.

- *Invasion of Privacy*: Invasion of privacy means getting personal data about individuals that can harm him in any case. Privacy of an individual's professional or personal credibility harms by using social networks i.e. promoters can provide their email list to Facebook to use custom audience features, so in that case they can target those email lists and harm them.

- *Spamming*: According to the user's perspective reading piles of spam that;s obviously useless but these promotional spamming messages harm users sometimes. Unnecessarily spamming messages gets into your message list and you fail to ignore them, in this situation users skip to get their relative information because of that list of spam emails [35].

- *Integrity Risk*: Nestle case provides best example of integrity risk where company's Facebook fan page posted offensive comment in revert to negative description by fans. This issue violated the company's integrity and the public joined the fan page to criticize the company and post negative comments about the company and its reputation.

C. How to address Issues and challenges of Social Networks

- *Create social media strategy*: Using social network business management can build social media strategy which includes planning of what to do and what to achieve. Strategy goals should be specific and effective before implementation. This strategy can keep track of your objectives and measure whether you are succeeding or failing.

- *Choose an effective social platform*: Choosing an effective social platform depends on the audience where they spend their time and where they are active. Millions of followers doesn't necessarily mean you have an audience. Effective social networks offer targeting capabilities that can fulfill specific business goals.

- *Schedule when to post content*: Suitable content posting is one of the major tasks because wrong posting can affect individuals or organizations reputation so make sure your content should be accurate and meaningful while posting content on social websites. Correct timing necessary while posting content on social networks.

- *Create content strategy*: Making effective content strategy can be more powerful for users of social networks. Content with relevant images get more acceptance than without them because content with image and video can help to explain detail to others with impact and motion [36]. Content should be clear and relevant and not to be heavy in size. For managing data warehousing of social networks possible solutions are Bulk

Synchronous Parallel (BSP) and MapReduce algorithm. These are data processing techniques and displayed better performance.

- *Facilitate meaningful conversation*: Promoting too many brands annoys the audience sometimes. Conversation should be meaningful by using a tool such as followerwonk that creates a *word cloud,* which is a visualized series of words. There are other ways to engage and build meaningful conversation through reviews on Google Places and Facebook Page and encourage the production of User Generated Content(UGC) that may be appropriate to your business. Storytelling is the media that can explain core values and give them a strong reason to stick with related things.

5. RESEARCH FINDINGS

Technically, in recent years, the number of computer technologies have been developed. In the coming decade, these technologies will grow rapidly and as technology advances, risk increases. These research findings evaluate issues and challenges of cloud computing, virtualization and social networks and propose possible solutions and mechanisms to solve them. This study analyzes that security is the main concern for organizations by adopting these technologies, hence this paper recommends some solutions and future developments of these technologies.

Using only firewall devices will not help to solve these problems. Hence, combination of Intrusion Detection Systems (IDS) and Intrusion Prevention Systems (IPS) named Hybrid cloud IDPS scheme should be able to detect attacks on system and traffic load, the node heterogeneity such as federated cloud system, adjust network node numbers, to offer a satisfactory service.

Social Network and similar search engines can heavily impact the governance of a country by looking at statistics of public activity on these networks. These statistics and data analysis can be used to decide inappropriate policies and also manipulate the public by spreading partial and manipulated data. There should be an international organization or committee who can control private social networks. There are such organizations on country level especially in the U.S, but since these networks are spread over the internet, so an international organization is something we need. Social networks lack a lot in privacy management, without the users intention, the data is shared to multiple vendors. The terms and policies which are said to be signed are heavily complex. Solution would be to aware and educate the general users to make them conscious about how their data can be misused. The terms and conditions should be simplified, there must be a common protocol and format all applications should follow. Lastly, there should be strict guidelines to apply the strict privacy policy by default and constantly making them reviewed by the users.

After analysis we evaluate that clouds rely on virtualization technology for sharing computing resources and in virtualization big data processing is a major organizational problem. The analysis shows that

containerization (The building blocks of operating system level virtualization including deployable, packaged, standalone set of application components (i.e Docker, Linux Containers, Windows Container, Java Containers such as Spring Boot, Wildfly, Tomcat, Jetty)) and orchestration (Docker Swarm or Kubernetes) technologies are useful for solving Big Data Processing issue. These technologies allow one to automate the application deployment process and integrate with other solutions for solving problems related to data analysis and machine learning.

6. CONCLUSION AND FUTURE DIRECTIONS

Rapid growth of personal computing technology has become the basic need of users. Constantly information technology managers upgrading their skills to keep up with the latest technological changes in computer technology. As computer devices become smaller day by day and more sophisticated, for that reason IT managers are more concerned about challenges in technology. This study emphasized three issues and challenges including cloud computing, virtualization and social networks of information technology in management and their features and steps to overcome those challenges. In this paper we concluded that security is a major issue in all technology such as confidentiality, data integrity, availability, audit, control, etc. whether it is related to cloud computing, virtualization and social networks. Users cannot compromise their privacy so IT managers must ensure them that their data is secure and safe. Although, these technology has enormous features which is more beneficial for companies and customers like cloud computing offers combination of technology, platform that provides various computing services worldwide and virtualization provides the way to combine multiple IT resources for creating number of virtual machines to perform different task simultaneously and social networks can provide the medium to connect different region and country people on one online platform where they can share information with each other via text message, video and images. These technologies are not only useful for multinational companies, but they are useful for small and medium enterprises. Despite the success of these technologies it faces challenges which cannot be ignored. Hence, this paper also highlighted the solution of issues and challenges of these technologies.

This research work targeted issues and challenges of information technology in management and approaches in a direction so that these issues can be tackled. In our future work, we aim to identify that by using effective resources and strong framework these challenges can be managed easily. As pointed out, new policies and techniques can increase the performance and maintain data efficiently. Infrastructure, application and platform will become more powerful to extend the efficiency of these technologies or the collection of distributed computers can compute data and manage resources easily. As the development of these technologies are still at an early stage, this study will provide an effective understanding of issues and challenges of IT in management and their solutions. This will also provide appropriate direction for further research in this area.

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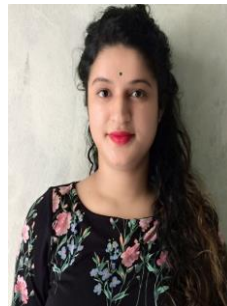
Vandana is currently working as lecturer in Atomic Technology College, Hossana, Ethiopia. She completed her Masters in Technology in 2016 during which she published one Research Paper on "*Test Path Generation Using Cellular Automata*" in International Journal. She is pursuing Ph.D. from Amity University Rajasthan, Jaipur. She has 7 years of professional experience and 1 year of national academic and 1 year of international academic experience.

Bornali Purkayastha obtained her Ph.D in Theoretical Physics from North Eastern Hill University, Shillong (India) in the year 2000. She has been teaching physics at the graduate and postgraduate levels for more than 18 years. She has published articles in reputed international and national journals. She has also authored two books on High Energy Physics. She is a member of IET and a life member of Indian Physics Association.

Anil Kumar completed his Ph.D. in computer science & engineering from Kurukshetra University, Kurukshetra, Haryana. He is having more than 12 years of academic and professional experience. He is currently working in Wachemo University ,Hossana, Ethiopia as Assistant Professor. He has guided thesis for one doctoral research scholar and more then 10 post graduate level students. His research work contains 20 published research papers in reputed national/international journals and attended more than 5 conferences and workshops regarding information technology and computer science & engineering.